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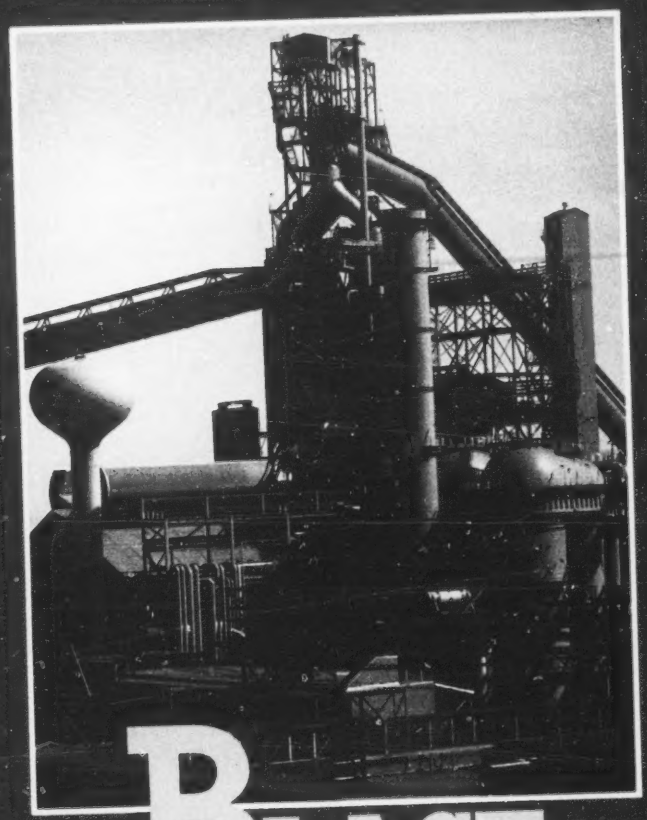
IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

MARCH 7, 1983



BLAST FURNACE PERFORMANCE REPORT

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ALSO: 'NO-SLAG' STEELMAKING WAITING IN THE WINGS

VOL. 226, NO. 7

IRON AGE

MARCH 7, 1983

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There may be fewer and fewer blast furnaces on the American steelmaking scene these days, but the industry has learned to get more iron from those remaining furnaces.

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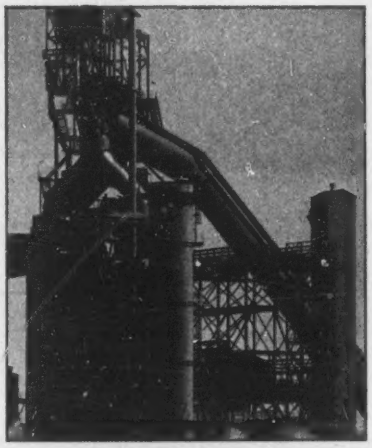

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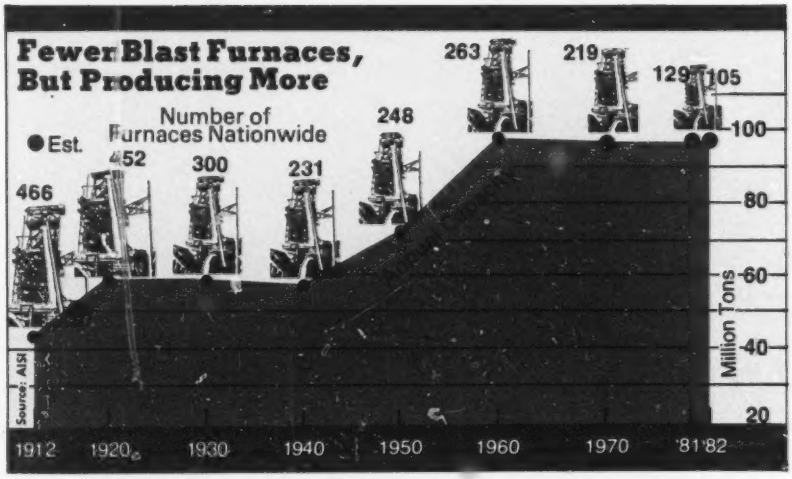
The truth about capital spending

IRON AGE (ISSN 0164-5137) is published 36 times a year with a frequency of every 10 days appearing on a Monday-Wednesday-Friday cycle of every month by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. Non-metalworking companies, services, government, institutions, schools and colleges, $55 one year. Canada, $55 year. Foreign, $65 one year. Single copies, $2.50. Cable Chilton, Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA 19089

STEEL IMPROVES ITS BLAST FURNACE EFFICIENCY

American steelmakers may be cutting back the number, but they are getting more iron from the remaining furnaces.

BY GEORGE J. MCMANUS



Is the North American blast furnace an endangered species?

In places like Lackawanna, N.Y., Johnstown, Pa., and Fontana, Calif., blast furnaces are no longer found or won't be shortly. The last blast furnaces in the city of Pittsburgh are being torn down.

There is no question the big iron furnace faces an increasingly harsh environment across the continent. This is partly due to the depressed state of the steel industry. It is also due to competition from the electric furnace and scrap. Finally, the relatively small North American species must compete with much larger furnaces abroad.

If history is any guide, however, the efficiency of the blast furnace will increase faster than people are tearing furnaces down. At any rate, attrition will be far less than a head count of the remaining furnaces would indicate.

That has been the pattern. During the Depression of the '30s, 70 blast furnaces were scrapped. At the end of the decade, there was more blast furnace capacity—56 million tons—than at the start.

In 1960, there were 263 blast furnaces in the U.S. These could produce 96 million tons. By 1981, the number of furnaces was down to 129, but ironmaking capacity was about the same as in 1960.

According to unofficial estimates, there are now 105 blast furnaces standing. One authority says only about 60 of these will ever be operated again. Only 35 were actually operating in January of this year.

The recent reductions probably reflect some contraction of the whole steel industry, but again, they also reflect the fact that the same amount of iron can be produced by fewer furnaces.

"What we could produce on four furnaces in 1960 we can produce now on two furnaces," says E. J. Ostrowski, director, quality assurance and technology, National Steel Corp.

If you take today's biggest and best blast furnaces, the effect of technical change is even more dramatic. In 1960, the average U.S. blast furnace could turn out a little over 1,000 tons a day. The new L furnace at the Sparrows Point plant of Bethlehem Steel Corp. has produced over 8,000 tons a day. The No. 7 furnace of Inland Steel is built for the same kind of production.

Some of the things that have been done and are being done are outlined by Mr. Ostrowski. He cites: "Increased hot blast temperatures with fuel injection; improvement in the quality of sinter—we learned how to make basicity sinter that had integrity and cleanliness.

"The use of pellets substituted for coarse ore; improvements in coal quality and coke quality; understanding and beginning to control burden distribution; oxygen enrichment and for a very few furnaces, high top pressure."

Some engineers see a technical plateau ahead for domestic blast furnaces. The acid pellets now being charged do impose temperature ceilings on furnaces. However, operators feel that bridge will be crossed in due time.

Meanwhile, there are all kinds of opportunities for upgrading existing furnaces. Most of the improvements will have to come on existing furnaces because no one is rushing out to build new blast furnaces these days.

Operators are confident they can meet this challenge. "In our case, what we're trying to do is develop our small furnaces to a world standard," says J. E. Holditch, superintendent of blast furnaces for Dofasco, Inc.

"It is our belief," says Mr. Holditch, "that through continuous upgrading of the small furnaces, they can be every bit as efficient as the large furnaces—in terms of fuel rates and in terms of dollars per ton."

One way to upgrade any furnace is to

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install a Koppers-Wurth bell-less top. The new Inland and Bethlehem furnaces have this top but the only older U.S. furnace to be equipped with it is at the Warren, Ohio, plant of Republic Steel Corp.

A look at the Warren project explains why there hasn't been more action. "Basically, we tore the top of the furnace right off, right down to the top of the columns," says J. Fischley, coordinating chairman of primary operations for Republic. "When you looked at that furnace right after it was torn down, all you could see was a couple of columns.

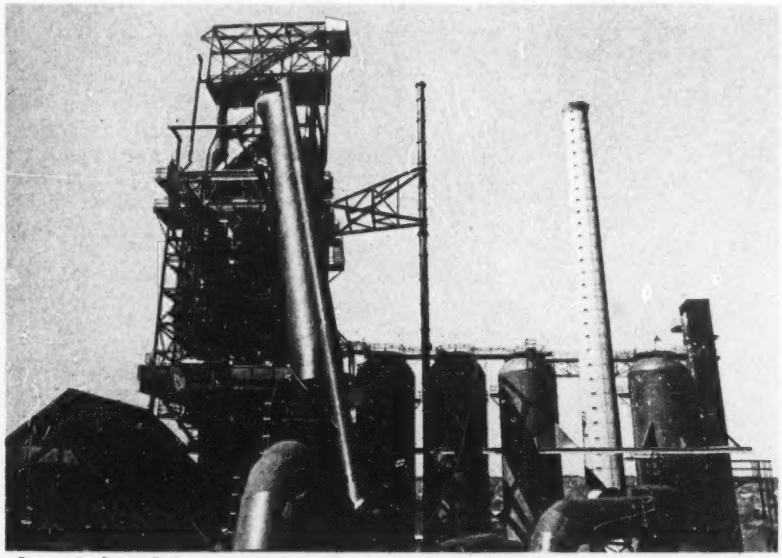
"Of course, the bosh comes out so we put up a new stack. Before we even started to put that stack up, we had to reinforce the hearth. And all the paraphenalia on top—the uptakes, the downcomers, and all the structure on top of the frame. So we did what I would consider a rather unique job of it."

With the new top, Republic could expect higher production. To accommodate this, the company put in a second iron notch and two new cast houses. For a further production increase, Republic installed two new stoves of its own "maxi-stove" design.

Republic went to all this trouble for a variety of reasons. The bell-less top is equipped with a rotating spout which permits precise distribution of the burden. By itself, this gives significant fuel savings.

"They're anywhere in the range of 45 to 55 lbs of coke as a direct benefit," says A. J. Dzermejko, manager of the metallurgical project section at Koppers Co., Inc. "And in addition, there's a 10 to 12 pct production increase just by putting this hardware on the furnace." Licensed by Paul Wurth of Germany, Koppers supplied all three of the American bell-less systems plus one to Fundidora in Mexico.

Another advantage of the bell-less system is that it provides a seal that stands up under high top pressure. Ten or 20 years ago, 5 psi would have been considered high pressure. The Warren furnace, with the bell-less top—can go to 15 psi. The Sparrows Point and Inland furnaces can go to 35 psi.



Republic Steel Corp. is one steelmaker getting more output from its existing blast furnaces. It relined and modified the furnace at its Warren, Ohio, plant during 1980 and 1981 and boosted the furnace's daily iron capacity from 2,800 tons to 3,400 tons.

All of which translates into greater efficiency and faster production. The 28-ft Warren blast furnace, which was originally built in the '30s, was producing around 2,800 tons a day before the rebuild. Republic is shooting for 3,400 tons a day now. The market slowdown has prevented a full test, but the company says the furnace is performing as expected.

As has been indicated, production of 3,400 tons a day can create a bottleneck in an older furnace. "We felt we needed a second tap hole to reach that level," says Mr. Fischley. "It's kind of a rule of thumb in the industry that furnaces of this size can get by with a single tap hole below 3,000 tons a day. But when you get up into the 3,000-to-3,400 range, it's much better to have a second tap hole."

As this suggests, one thing can lead to another when you start monkeying around with a blast furnace. With steel companies strapped for cash, suppliers are looking for ways to scale down the cost.

"If you haven't got the money now, do it bit by bit," says Ian MacLaren, executive vice president, Bailey-Hoogovens Co. The Sparrows Point L furnace has stoves of the Hoogovens design. Bailey Hoogovens has been involved in upgrading furnaces at Dofasco, Stelco, Inc., and other mills.

"First thing is to get the stove right, the lining correct," says Mr. MacLaren. "We hope that the linings will remain there for 20-25 years. Control systems, injection systems, burner changes can be made at a later date."

Much the same advice comes from N. B. Browne, sales manager for Bischoff Environmental Systems. Bischoff scrubbers are used on some 60 foreign blast furnaces. In this country, they have been installed on the new Bethlehem and Inland furnaces. Advantages cited include compactness, relatively quiet operation and the ability to control high top pressures.

"There's a whole new concept," says Mr. Browne. "Our whole big scrubber with all this nice stuff and instrument control is not always needed. In a relined blast furnace, where they're just upgrading blast cleaning equipment, they may not want a whole new scrubber. So now we're offering different components of our scrubber to accomplish different objectives."

A good example of systematic, step-by-step upgrading is at the Hamilton, Ont., plant of Dofasco. There are three 21-ft blast furnaces at Hamilton and one 28-ft furnace.

"Back in the early '70s," says Mr. Holditch of Dofasco, "we couldn't smelt as much iron as we wanted to. We set about doing a bunch of things, including external desulfurization, working with our mines to improve pellet properties, working with our coke plant to improve the quality of the coke.

"We got to the point where we could smelt more iron than we could cast," continues Mr. Holditch. "On our last reline of the small furnaces, we put in iron notches. We probably have the three smallest two-tap-hole furnaces in the world.

"Now, we can smelt more iron and cast more iron than the lower stack and bosh cooling system can support. We have to pace ourselves until we get to the next set of relines and we can upgrade the cooling system." Mr. Holditch feels the use of silicon carbide refractories is tied to improved cooling. "The two go hand in hand," he says.

"Once we have the cooling system upgraded and by that time, hopefully, we will have improved the high temperature properties of the pellets, then our operation will support a higher flame temperature than what our stoves are capable of giving.

(Cont. on p. MP-10)

"At that time, we'll be looking at upgrading the stoves." The upgrading will have to take in all the ancillary equipment, Mr. Holditch notes.

Dofasco has installed a bell-less top on its 28-ft furnace. "That furnace can produce in the neighborhood of 4,000 tons a day if we use oxygen enrichment," says Mr. Holditch. "We are not operating with higher top pressure."

Dofasco is staying with a relatively low blast temperature—1,750°F—on the 28-ft furnace. Without the benefit of either added pressure or temperature and using a 100 pct pellet charge, the furnace can produce 10 to 12 pct more iron.

"Improving the burden distribution gives you better gas-solid contact," explains Mr. Holditch. "That decreases the fuel rate by a 4½ pct. A decrease in the fuel rate by 4½ automatically yields an increase in productivity of 4½ pct for the same wind rate.

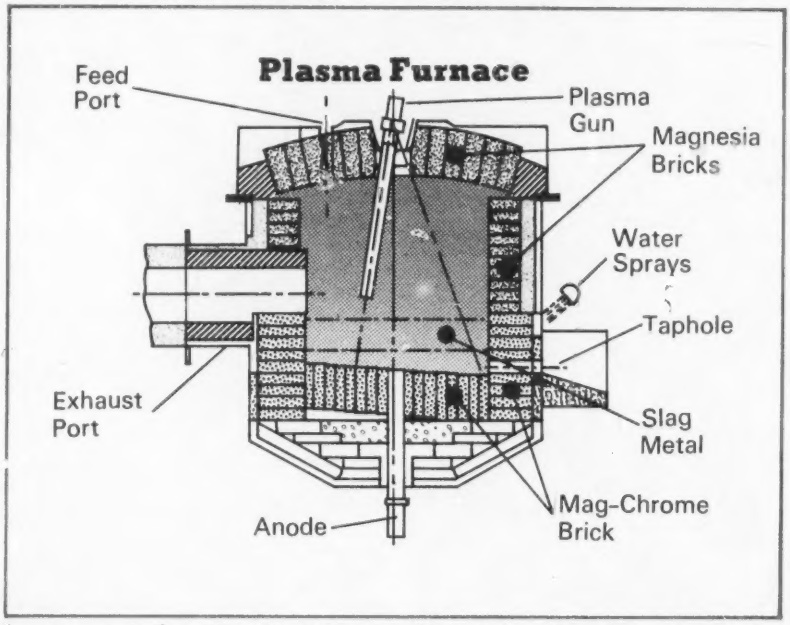
"Because of improved permeability, we were able to blow more wind and therefore received another 5½ pct in productivity."

Dofasco is supplementing its coke charge with 50 kgs of oil. In addition to conserving coke, oil has the effect of moderating flame temperatures. There was a general move away from oil when prices shot up and shortages developed a few years ago. The oil supply situation has eased for a while, but for the long pull, operators may find themselves restricted to coal-based fuels.

At Ashland, Ky., coal injections systems developed with Babcock & Wilcox have been installed on two Armco blast furnaces. In an AISE paper, Armco reported that the Ashland Amanda furnace was charged with 143 lbs of coal per ton of hot metal during 1981. In August 1981, the Armco injection technology was used by Nippon Steel Corp. to inject 115 lbs of coal per ton of iron at Oita Works.

Armco compares the cost of coal at $50 a ton with $120 a ton for coke and $200 for oil. Apart from the direct savings, coal has some effect in lowering flame temperatures, although not as much as oil.

Armco's Bellefonte furnace at Ashland has been equipped with a thicker lining and a Bischoff scrubber. Three of the four stoves have been rebuilt, using the Didier design. To improve burden distribution, an 18-in. skirt has been added to the big bell. From the mantle upward, 35 ft of stack shell plate provide greater cooling density.



Armco spent $19 million on these Bellefonte furnaces. Goals are reduced fuel consumption and a 5-million-ton campaign. At Middletown, Ohio, Armco is seeking better distribution through the use of Krupp adjustable armor.

"We've had varying experience," says A. P. Kerschbaum, manager of raw materials and ironmaking in Armco research. "There has been better experience with sinter than pellets." The round pellets tend to roll, explains Mr. Kerschbaum.

Bethlehem has been operating the Sparrows Point L furnace with a burden of half sinter and half pellets. The hot blast temperature runs around 2,250°F. The Hoogovens-type stoves on L furnaces could go higher, but Bethlehem is afraid of stress corrosion problems.

Equipped with the bell-less top, the L furnace has operated with top pressures of 25 to 27 psi. Bethlehem's two Burns Harbor furnaces, which are among the best in the country, have IHI tops and operate with top pressures around 16 or 17 psi.

The company is pleased with the bell-less top. "It lets you operate at a higher top pressure," says R. L. Warrick, blast furnace specialist in Bethlehem's engineering department. "It gives you some control of the distribution. That helps in the coke rate and in the campaign life. We'd love to put those things on all of our furnaces, but we're having trouble coming up with the money."

Monthly production with the L furnace has gone over 8,600 tons a day and over 9,000 tons have been turned out on individual days. The problem in the last year or so has been to keep production down to a rate that fits depressed market conditions.

"We've had to slow it down to the point where it's a hardship," says Mr. Warrick.

Bethlehem's general blast furnace program calls for reducing fuel rates, boosting productivity and improving availability. A big aim is to extend campaign life.

"What we're trying to do is improve the design of our cooling plates," says Mr. Warrick. "We're trying to get more water through the cooling plates and to reduce the pressure drop associated with the piping outside the furnace. We think we're headed in the right direction for solving the lower stack area of the furnace where we've had our campaign limitation."

Like Dofasco, Bethlehem feels better cooling is a requirement for using better refractories. "We have to have it for silicon carbide," says Mr. Warrick. "If we put the carbide in, we've got to improve the cooling."

Bethlehem's L furnace has a closed cooling system. At other locations of Bethlehem and others, the cooling systems are open. Some of the U.S. problems stem from the use of muddy river water, says O. G. Gramp, product manager of blast furnaces for Mannesmann Demag Corp.

Mr. Gramp notes that Mannesmann blast furnaces are cooled with treated boiler water in closed systems. Dense spacing of cooling plates also helps, he says. "All they have to do is add more plates." He notes that Mannesmann has had 8.5-million-ton campaigns.

At the Lake Erie plant of Stelco, Inc., operators have the task of operating a large, modern furnace at from 25 to 50 pct of capacity. Started in May 1980,

(Cont. on p. MP-15)

(Cont. from p. MP-10)

the Lake Erie furnace has a hearth diam of 33.9 ft. It has the Paul Wurth bell-less top and can operate with a top pressure of 15 psi. Stoves are of the Hoogovens design and can take blast temperatures well over 2,000°F.

Initial capacity of the Lake Erie blast furnace is between 3,500 and 4,000 tons a day. When all the support facilities have been installed, the furnace will be able to make 5,500 tons a day.

If the full amount of added iron were converted to finished steel, it would overload the Canadian market. Accordingly, Stelco designed the Lake Erie plant for incremental expansion. Output of the blast furnaces is limited by requirements of the steel shop and ultimately by the single strand slab caster.

"We've been running this furnace well below designed capacities ever since it started up," says Robert Milbourne, general superintendent of Lake Erie. Production has ranged from 1,800 tons of iron a day to 2,700 tons a day at present. "Hot blast temperatures would be in the range of 1,600 to 1,700°F.," says Mr. Milbourne. "We have a single iron notch," he adds.

The business of slowing a blast furnace to 25 to 50 pct of its potential takes some learning. "It's not difficult once you learn how," says Mr. Milbourne. "It doesn't look very efficient. You don't get very good coke rates. You get higher silicon hot metal and you tend to run at higher slag volumes.

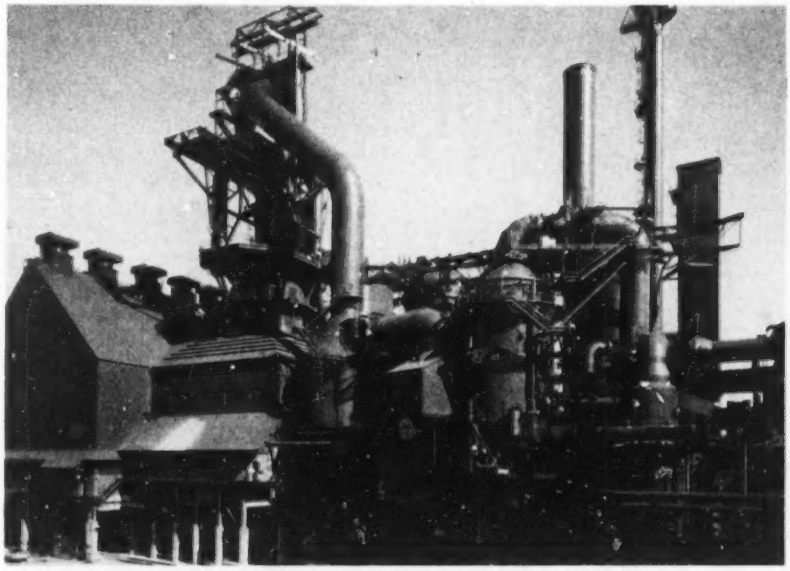
"That excess fuel shows up in silicon in the hot metal and richer gas. That doesn't present us with a problem because we have demands for the energy."

Mr. Milbourne feels the bell-less top has been useful at low operating levels. "We've been able to fine tune the burden distribution to avoid major operating problems. Our availability on this furnace—our tuyere life and conservation of the original lining under very adverse conditions—has really been remarkable. The people here have done a helluva good job. We do attribute at least some of this success to the ability to put burden materials exactly where we want them."

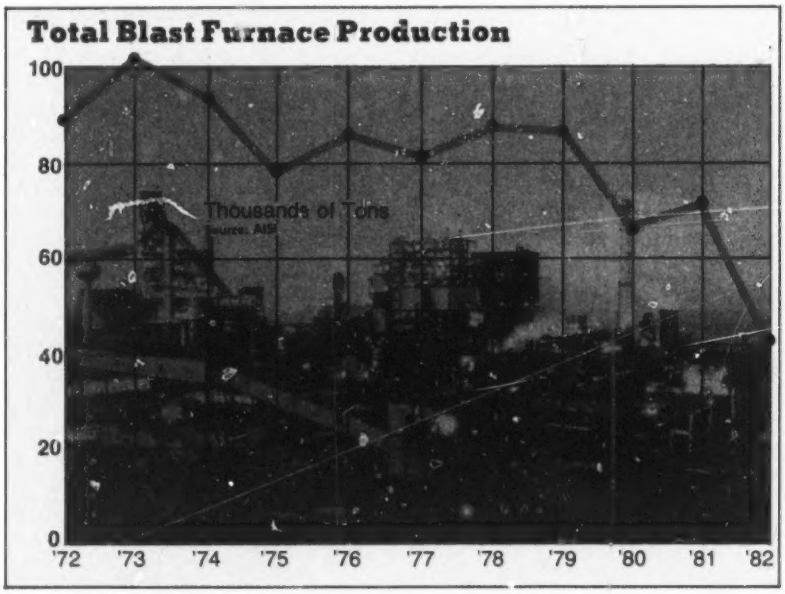
Mr. Milbourne sums up Lake Erie's experience this way: "People have learned to make iron on demand."

There is one potential roadblock ahead for North American blast furnaces. "Most of the American furnaces use primarily pellet burdens," says Mr. Dzermejko of Koppers. "The pellets soften at flame temperatures of about 3,800°F."

Without fuel injection, that translates into a hot blast ceiling of 2,100 or 2,200°F. Anything hotter will cause the acid pellets to soften. "They start getting mushy," says Mr. Dzermjko. "What you get is a semi-congealed mass that hangs up in the furnace and decreases the permeability."



Dofasco, Inc. has followed a systematic, step-by-step plan for upgrading the blast furnaces at its Hamilton, Ontario, plant.



This could be a serious limitation in the future. The Japanese, who operate with flame temperatures as high as 4,400°F., get as much as 8 tons a day per 100 cu ft of working volume.

These results are possible because the Japanese and the Europeans have always relied more on sintering than pelletizing. In recent times, pre-fluxed sinter has been widely used.

Compared to pre-fluxed sinter, the acid pellets have two disadvantages. First, they leave the job of calcining limestone or dolomite to the blast furnace. This adds to furnace energy consumption.

As has been indicated, the second difficulty is that acid pellets can't take high temperatures. This fact has been recognized in Japanese blast furnace practice.

"They cannot stand more than 20 pct acid pellets," says A. Berzins, vice president, engineering, Davy McKee Corp. "They can use 60 pct fluxed pellets."

U.S. producers have run tests on pre-fluxed pellets from Brazil and Sweden. Mr. Berzins reports that lime fluxed pellets soften at 1,155°C. That is compared with softening temperatures of 1,150°C for acid pellets and 1,230°C for superfluxed sinter. A softening temper-

Trends in Metalproducing

In its continuing coverage of metal producing *Iron Age* has in recent months published the following articles:

Steel Turns Loose Billions for Expansion
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Cooling Heats Up Electric Furnace Production
Oct. 5, '81, p. MP-7

Jones & Laughlin's Pollution Control Philosophy
Nov. 2, '81, p. MP-9

World Steelmakers Chase A Higher Quality Steel
Dec. 7, '81, p. MP-7

Seamless Mills: Steel's Explosion in the Oil Country
Jan. 4, '82, p. MP-8

Wave of Rail Mill Construction Gets Untracked in Steel
Feb. 1, '82, p. MP-4

Steelmaking Controls Give Quality, Throughput, and Energy Efficiency March 1, '82, p. MP-7

New Generation of Electric Furnaces Set New Outer Limit
April 5, '82, p. MP-39

Auto Market Demand Has Sheet Production Stalled in First Gear
May 3, '82, p. MP-3

New Role for Ladle Metallurgy—High Tonnage Output
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Creative Financing Keeps Money Flowing in Steel
July 5, '82, p. MP-9

Slump Threatens to Pinch the Minimill Growth
Aug. 2, '82, p. MP-5

New Challenge Takes Shape in Rolling Mills
Sept. 6, '82, p. MP-8

Electrical Steels Drive Toward High Efficiency Rating
Oct. 4, '82, p. MP-7

Steel Writes the Final Chapter on Pollution Control
Nov. 1, '82, p. MP-5

World Steel Producers Put Tight Grip on World Steel Output
Dec. 6, '82, p. MP-3

Electric Furnace's One-Two Punch—Low Costs and High Quality
Jan. 3, '83, p. MP-7

Why More Companies Are Committing to Continuous Casting
Feb. 7, '83, p. MP-4

ature of 1,210°C. is reported for dolomite fluxed pellets.

Unfortunately, the dolomite and limestone deposits are nowhere near North American pellet plants. "The problem could be one of economics," says Mr. Ostrowski of National Steel. "You're going to ship the flux to the place where the pellet is produced and then ship the pellet back."

Somewhat similar comments come from Mr. Holditch of Dofasco. "We have run experiments with prefluxed pellets," he says. "They have some disadvantage for our mining operation. What you really want is high temperature reduceability. If you can improve the high temperature properties of pellets, then there are other ways to get calcined flux in your burden." Mr. Holditch mentioned a process in which limestone is calcined in a kiln with 10 pct mill scale. This gives burnt lime with a protective coating.

One answer might be to sinter the ore concentrates. That isn't practical with the very fine concentrates, but there are deposits which can be concentrated in fairly coarse form. If this proves the general answer, more modern sintering capacity would be needed.

The subject is further complicated and confused by commercial considerations. "So many of these arguments are not purely technical," says J. D. Hinrichsen, technical director, mining, minerals and metals, Dravo Engineers, Inc. When people have wanted to secure a price on pellets, he indicates, they have invented tests to show quality problems.

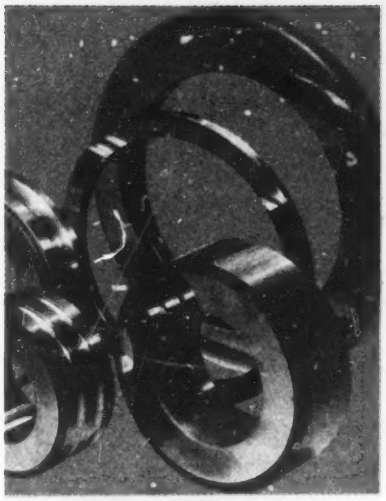
A deterrent to pre-fluxing, says one authority, is the fact that pellets are priced on the basis of iron content. Adding flux would reduce the iron volume in the pellet.

An enormous effort is going into fine tuning blast furnaces today. This takes in off-line simulation, on-line temperature probes and computer control.

In Finland, process controls are credited with reducing the fuel rate to 441 kg per ton at the Koverhar Works of Outokumpu Oy. If Finland seems a long way from Gary, Ind., it really isn't. U. S. Steel is buying the Koverhar process control system for Gary's No. 13 blast furnace.

The Koverhar display unit lets the turn foreman view the furnace "like a video game," says T. M. Barnes, manager of ironmaking technology for Outokumpu Engineering, Inc. The control system can save from 50 to 100 lbs of coke, says Mr. Barnes. Cost is about $1 million.

To get the most out of its bell-less top, Republic has gone to an extensive



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network of probes on its Warren furnace. A supervisory computer provides a graphic display of the temperature profile of the furnace. This information is fed to the controller which operates the top. All elements contributing to flame temperature are continuously monitored.

Mr. Milbourne of Stelco feels hardware is just half the answer in getting good burden distribution. "We have a fair degree of instrumentation on this furnace," he says. "We have extensive in-wall thermocouples and we have an infra-red scanning camera." A Wurth top by itself, has limited value, he indicates. "But a Wurth top in conjunction with other intelligence is very useful, no matter what level of operation."

What people are trying to do is home in on the best combination of design and operating factors. "As you increase your smelting rate," says Mr. Holditch of Dofasco, "you place more demands on your cooling system. And really, operating the furnace is a compromise between distributing the burden to protect the walls and improving your cooling system so it can afford the luxury of charging your burden for maximum efficiency."

In their optimizing, operators are being assisted by the work steel companies are sponsoring at Purdue Laboratory for Applied Industrial Control. The Purdue people have devised a dynamic model of the blast furnace.

"This model has been verified at Bethlehem and Algoma," says T. J. Williams, professor of engineering at Purdue and director of the laboratory. "We can do anything you do in a real blast furnace."

Purdue, incidentally, has come up with a hierarchial computer control system for the overall steel plant. The Japanese have placed great emphasis on this type of control.

Dofasco and others have been looking at plasma torches for iron making. At the AIME electric furnace conference, a report on the use of a plasma furnace for smelting ores and mill wastes was given by Tectronics Research and Development Co., Ltd., Faringdon, Oxon, England.

The plasma torch of Westinghouse Electric Corp. has been used in European research to heat natural gas and air injections to a blast furnace. These developments suggest there is no end in sight to the ways of upgrading existing furnaces. □

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For Information, Circle 125

EFFECTIVE FEBRUARY 21, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Steel Production, Composite Prices

(Effective February 21, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,401	1,373	9,252	12,415
Capability Utilization Rate	48.3	47.4	44.7	59.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	25.954	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 69.83	$ 67.50	$ 66.83	$ 82.50
No. 2 bundles	$ 47.83	$ 47.83	$ 47.83	$ 56.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 74.50	$ 69.50	$ 69.50	$ 92.50
No. 1 steel, Philadelphia	63.50	61.50	59.50	75.50
No. 1 steel, Chicago	71.50	71.50	71.50	79.50
No. 1 bundles, Detroit	61.50	61.50	60.50	83.50
Low Phos., Youngstown	69.50	69.50	69.50	95.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast. Chi	109.50	109.50	109.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Nonferrous Prices

(Effective February 21, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	82.00-83.00	80.00-83.00	2/16/83
Lead	21.00-23.00	20.50-23.00	2/17/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $505.50
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$335-$360
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $14.49
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Feb. 14—Holiday
Feb. 15—Holiday
Feb. 16—590.91
Feb. 17—588.84
Feb. 18—588.84

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	64¼	63
Red brass	69½	65
Comm. bronze	71	65
Mang. bronze	62¾	61
Free cutting rod ends	55	54

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	70
No. 2 copper wire	62
Light copper	53

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	66
No. 2 copper wire	58
Light copper	49
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	31	—32
Old sheet	29	—30
Old cast	29	—30
Clean dry borings	30	—31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	—26
Mixed L.C. clips	22	—23
Old sheets and cast	17	—18
Borings and turnings	11	—12
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	53	—54
No. 2 copper wire	46	—47
Light copper	41	—42
Radiators	35	—36
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	31	—32
Clean heavy yellow brass	29	—30
Brass Pipe	29	—30
New soft brass clippings	40	—41

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

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EFFECTIVE FEBRUARY 21, 1983

MATERIALS NEWSFRONT

(Effective February 21, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	87.00 to	88.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	87.00 to	88.00
Heavy turnings	64.00 to	65.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails 2 ft. and under	94.00 to	95.00
Scrap rails, random lgth.	87.50 to	88.50
RR specialties	83.00 to	84.00
No. 1 machinery cast	66.00 to	67.00
Cupola cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	365.00 to	375.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	80.00 to	81.00
Shredder scrap	80.00 to	81.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	36.00 to	37.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	95.00 to	96.00
Low phos. 2 ft. and under	90.00 to	91.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails, random lgth.	69.00 to	70.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	91.00 to	92.00
RR couplers and knuckles	79.00 to	80.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	88.00 to	89.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	105.00 to	110.00
430 turnings	80.00 to	85.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	52.00 to	55.00
No. 1 dealer bundles	77.00 to	80.00
No. 2 dealer bundles	43.00 to	46.00
No. 1 busheling	77.00 to	80.00
Shredder scrap	74.00 to	77.00
Machine shop turn.	22.00 to	25.00
Mixed bor. and turn.	22.00 to	25.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	86.00 to	89.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	91.00 to	94.00
Cupola cast	57.00 to	60.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	27.00 to	28.00
No. 1 busheling	60.00 to	61.00
Drop forge flashings	37.00 to	38.00
Machine shop turn.	22.00 to	23.00
Mixed borings and turn.	11.00 to	12.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	10.00 to	11.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	65.00 to	66.00
Stainless		
18-8 bundles and solids	355.00 to	365.00
18-8 turnings	235.00 to	245.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	74.00 to	75.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	74.00 to	75.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	19.00 to	20.00
No. 1 busheling	34.00 to	35.00
No. 1 dealer bundles	32.00 to	33.00
No. 2 bundles	16.00 to	17.00
Machine shop turn.	5.00 to	6.00
Mixed bor. and turn.	12.00 to	13.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	11.00 to	12.00
Low phos. plate	52.00 to	53.00
Structural and plate, 2 ft. and under	50.00 to	51.00
Rails, 2 ft. and under	46.00 to	47.00
Scrap rails, random lgth.	26.00 to	27.00
No. 1 machinery cast	67.00 to	68.00
No. 1 cupola cast	44.00 to	45.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	71.00 to	72.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	69.00 to	70.00
No. 1 RR hvy. melting	55.00 to	56.00
Scrap rails, random lgth.	57.00 to	58.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	67.00 to	68.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	26.00 to	27.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	73.00 to	74.00
Rails, random length	55.00 to	56.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	64.00 to	65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	25.00 to	27.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	410.00 to	425.00
18-8 turnings	300.00 to	325.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	25.00
No. 1 dealer bundles	37.00 to	39.00
No. 2 bundles	20.00 to	22.00
No. 1 busheling	37.00 to	39.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 55.00 to	$ 57.00
No. 2 hvy. melting	44.00 to	46.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	90.00 to	92.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 38.00
No. 2 heavy melting cut 2 ft. and under	35.00
No. 1 dealer bundles	45.00
No. 2 bundles	5.00
Mixed steel scrap	22.00
Bush. new fact. prep'd.	43.00
Bush. new fact. unprp'd.	35.00
Machine shop turn.	20.00
Short steel turn.	23.00
Mixed bor. and turn.	12.00
Cast scrap	35.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 41. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.=Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	20.20
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	30.15
W14	22.95
S1, J4	34.05
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	24.60
G4	25.80
I4	22.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	39.40
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	19.90†
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35

†Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)	
East	**per base box**
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.25	27.91	31.51	31.86	24.27	26.45	17.89	32.91	42.10	52.60	69.58	73.19
Baltimore	32.25	24.49	32.76	34.74	28.33	31.13	22.17	36.44	55.85	59.91	67.79	76.32
Birmingham	22.27	28.05	32.24	31.99	24.06	26.26	17.99	33.40	49.31	68.90	68.16	74.43
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	22.26	28.66	31.01	29.34	26.76	27.28	15.83	35.60	35.94	42.45	49.53	54.47
Cincinnati	23.88	29.74	32.95	33.98	26.44	29.86	16.74	36.10	35.89	41.74	47.18	52.56
Cleveland	28.85	32.41	34.98	32.65	28.44	32.10	17.97	42.92	39.27	49.22	55.16	61.24
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	24.88	31.65	32.95	33.74	26.31	26.79	16.83	37.64	36.87	40.55	46.33	52.90
Houston	23.83	28.28	32.53	41.35	34.12	37.90	17.16	38.14	36.36	42.15	50.79	56.90
Kansas City	23.37	27.16	31.59	30.36	30.20	34.55	17.37	43.29	41.88	50.92	56.17	63.93
Los Angeles	30.02	38.03	39.14	45.66	37.13	38.95	33.49	50.38	62.24	72.33	77.74	89.22
Memphis	31.68	36.62	38.40	38.57	31.40	35.20	32.21	42.33	52.82	56.96	67.85	77.44
Milwaukee	22.92	29.30	31.79	31.10	28.50	29.20	15.71	36.06	36.88	47.20	52.71	59.02
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	59.83	66.45	75.35
Philadelphia	29.67	35.27	37.96	45.73	32.87	36.09	22.93	48.35	51.67	58.71	67.13	74.37
Pittsburgh	24.35	28.58	32.34	41.36	35.30	27.43	25.80	43.19	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.27	35.77	39.71	45.05	38.70	39.18	31.92	51.14	62.56	71.65	77.93	86.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	25.80	30.08	33.47	38.51	27.81	32.45	19.08	42.83	43.13	51.08	58.11	63.64
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	16.87	43.07	39.20	48.63	51.53	60.75

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ⅜-2⅛"; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅜" round; Cold drawn—1" round; Hot-rolled 4140—1⅜" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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